

Claims

1. Transportable concrete mixing plant (10), comprising a number of mixing plant components which 5 can be connected detachably to one another and which during transport are accommodated in a number of containers (C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13), at least some of these containers (C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13), 10 preferably all of these containers, serving as a load-bearing structure for mixing plant components and/or containers for concrete raw materials when the mixing plant (10) is operating.

15 2. Transportable concrete mixing plant (10) according to Claim 1, characterized in that the containers (C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13) are standard shipping containers or can be combined into standard shipping containers which can 20 be transported in a standard way in accordance with international regulations, especially by ship, rail and heavy goods vehicle.

25 3. Transportable concrete mixing plant (10) according to Claim 1 or 2, characterized in that at least some containers (C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13) have openable hatches (L1, L1a, L2, L2a, L3, L3a, L3b, L4, L4a, L5, L5a, L6, L7) through which, when the mixing plant (10) is operating, 30 mixing plant components accommodated in various containers (C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13), at least to some extent, can work together.

35 4. Transportable concrete mixing plant (10) according to one of the preceding claims, characterized in that it has at least one mixer container (C2), which contains at least one concrete mixer (12) for the mixing of aggregates, of preferably cement-containing

binder, of water and of additional compounds and additives for producing concrete.

5. Transportable concrete mixing plant (10) according to Claim 4, characterized in that the wall of the mixer container (C2) which is located above each mixer (12) when the plant is operating has a hatch (L2) which can be opened above each mixer (12).

10 6. Transportable concrete mixing plant (10) according to Claim 5, characterized in that it comprises at least one stackable mixer container (C3) which, when the mixing plant (10) is operating, is arranged on the mixer container (C2) and which contains 15 loading means for the introduction of binder, preferably cement, and of aggregates and, if appropriate, additives into each mixer (12) through the openable hatches (L2) located in the upper wall of the mixer container (C2) and through hatches (L3) which can 20 be opened and are located in the bottom wall of the stackable mixer container (C3), opposite these hatches (L2).

7. Transportable concrete mixing plant (10) according to Claim 6, characterized in that the loading means for each mixer (12) comprise a pilot silo (48) for aggregates and a binder hopper (24) for binders and, if appropriate, for additives.

30 8. Transportable concrete mixing plant (10) according to Claim 7, characterized in that the binder hopper (24) and, if appropriate, the additive hopper contains a balance.

*Sub 35* 9. Transportable concrete mixing plant (10) according to one of Claims 6 to 8, characterized in that a binder conveying means (22) leading through an opened hatch (L3a) in a wall of the stackable mixer container (C3) into the latter is provided for the

introduction of binder and, if appropriate, additive into the stackable mixer container (C3).

10. Transportable concrete mixing plant (10) according to Claim 9, characterized in that the binder conveying means (22) leading into the stackable mixer container (C3) is a feed screw.

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11. Transportable concrete mixing plant (10) according to one of Claims 6 to 10, characterized in that when at least two mixers (12) are used, an aggregate conveying means (56) is provided, having a running direction which can be changed over optionally in order to feed the aggregates to the loading means (48) respectively assigned to a mixer (12).

12. Transportable concrete mixing plant (10) according to Claim 11, characterized in that when at least three mixers (12) are used, the aggregate conveying means (56) can be moved to and fro over the loading means (48) for the aggregates, between a number of operating positions in which each end of the aggregate conveying means (56) is assigned to a loading means (48) for aggregates.

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13. Transportable concrete mixing plant (10) according to Claim 11 or 12, characterized in that the aggregate conveying means (56) is a conveyor belt.

14. Transportable concrete mixing plant (10) according to one of Claims 6 to 13, characterized in that an inclined conveying means (44) passing through at least one wall of the stackable mixer container (C3), through an opened hatch (L3b), is provided for introducing the aggregates into the stackable mixer container (C3).

15. Transportable concrete mixing plant (10) according to Claim 14, characterized in that the

inclined conveying means (44) is a conveyor belt which, during transport, is accommodated in the folded-up state in an inclined conveyor-belt container (C4).

5 16. Transportable concrete mixing plant (10) according to one of Claims 4 to 15, characterized in that that wall of the mixer container (C2) which is at the bottom when the plant is operating has, under each mixer (12), a hatch (L2a) which can be opened to remove concrete from the mixer container (C2).

17. Transportable concrete mixing plant (10) according to Claim 16, characterized in that the mixer container (C2) is erected on a standing surface of a 15 mixer frame (52) which is dimensioned such that concrete can be discharged through the openable hatches (L2a), in order to remove concrete from the mixer container (C2), into a heavy goods vehicle (54) or the like provided underneath the standing surface.

20 18. Transportable concrete mixing plant (10) according to Claim 16, characterized in that when the plant is operating, the mixer container (C2) stands on an offloading container (C1), in whose top wall hatches 25 (L1) which can be opened are provided, opposite the openable hatches (L2a) in the bottom wall of the mixer container (C2).

19. Transportable concrete mixing plant (10) 30 according to Claim 18, characterized in that there is provided in one end wall of the offloading container (C1) an openable hatch (L1a), through which there passes a concrete conveying device, which during transport is accommodated completely in the offloading 35 container (C1), for conveying the concrete, for example to a heavy goods vehicle or the like provided beside the offloading container.

20. Transportable concrete mixing plant (10) according to Claim 19, characterized in that the concrete conveying device comprises an upper concrete collecting belt (60) which, when the plant is 5 operating, is accommodated completely in the offloading container (C1) and a lower concrete conveyor belt (62) which, when the plant is operating, passes through the openable hatch (L1a) in the end wall of the offloading container (C1).

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*Sub H* } 21. Transportable concrete mixing plant (10) according to one of the preceding claims, characterized in that it comprises at least one binder silo container (C7, C8) as a storage means for binder or the like, as 15 well as, if appropriate, a corresponding silo container for concrete additive.

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22. Transportable concrete mixing plant (10) according to Claim 21, characterized in that each binder silo and additive silo container (C7, C8), respectively, stands upright on its end face.

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*Sub H* } 23. Transportable concrete mixing plant (10) according to Claim 21 or 22, characterized in that at least two binder silo or additive silo containers (C7, C8) are erected beside one another or on one another.

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24. Transportable concrete mixing plant (10) according to Claim 22 or 23, characterized in that each binder silo or additive silo container (C7, C8) erected upright is fastened, by means of transverse struts (28), to the stackable mixer container (C3) and/or to the mixer container (C2) and/or to the offloading container (C1) or to the mixer frame (52) for the 35 purpose of stabilization.

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25. Transportable concrete mixing plant (10) according to one of Claims 21 to 24, characterized in that each silo container (C7) which is not standing on

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C1*

a further silo container (C7, C8), and the offloading container (C1) and/or the mixer frame (52) are fastened to a common baseplate (14).

5 26. Transportable concrete mixing plant (10) according to one of Claims 21 to 25, characterized in that each silo container (C7) which is not standing on a further silo container (C7, C8), when in its operating state, contains in its lower region a hopper (16) whose upper cross section essentially corresponds to the cross section of the silo container (C7) and which tapers downwards.

15 27. Transportable concrete mixing plant (10) according to one of Claims 21 to 26, characterized in that each silo container (C7) which is not standing on a further silo container (C7, C8) has, on its end face which is located at the bottom when it is operating, a concrete slab (26) for stabilization.

20 28. Transportable concrete mixing plant (10) according to Claim 26 or 27, characterized in that, in the operating state, a binder or additive conveying means (18) is arranged underneath the hopper opening, 25 and passes through a side wall of the silo container (C7) through an opened hatch (L7).

29. Transportable concrete mixing plant (10) according to Claim 28, characterized in that the binder 30 or additive conveying means (18) is a feed screw.

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30. Transportable concrete mixing plant (10) according to Claim 28 or 29, characterized in that the binder or additive conveying means (18) works together 35 with a vertical conveying means (20) which runs essentially vertically or obliquely upwards on an outer wall of the silo container (C7) in such a way that it can transfer binder or additive to the latter for onward conveyance.

31. Transportable concrete mixing plant (10) according to Claim 30, characterized in that the vertically or obliquely running conveying means (20) is a feed screw.

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32. Transportable concrete mixing plant (10) according to Claim 30 or 31, characterized in that the vertically or obliquely running conveying means (20) works together with the binder or additive conveying means (22) which runs partly in the stackable mixer container (C3) in such a way that it transfers binder or additive to the latter for onward conveyance.

15 33. Transportable concrete mixing plant (10) according to one of Claims 21 to 32, characterized in that in addition ladders (30), safety railings (32) and the like are provided on the outside of the silo container (C7, C8), which during transport are accommodated in a container, preferably this container

20 (C7, C8).

34. Transportable concrete mixing plant (10) according to one of Claims 21 to 33, characterized in that a concrete finisher (64) and/or a working platform or the like, during transport, are accommodated in a container, preferably a silo container (C7, C8).

35. Transportable concrete mixing plant (10) according to one of the preceding claims, characterized in that it comprises at least one metering-unit container (C5) which contains a metering device (34) for metering the aggregates.

36. Transportable concrete mixing plant (10) according to Claim 35, characterized in that the metering device (34) for aggregates has at least one weighing conveyor belt (34a) for weighing and transporting the aggregates, and at least one loading

means (34b) assigned to the weighing conveyor belt (34a).

37. Transportable concrete mixing plant (10) according to Claim 36, characterized in that each loading means (34b) is formed by a hopper which is arranged above the weighing conveyor belt (34), which tapers downwards and, upwards, opens wide towards an openable hatch (L5) in that side wall of the metering-unit container (C5) which is at the top when operating.

38. Transportable concrete mixing plant (10) according to Claim 37, characterized in that each metering-unit container (C5) is assigned a stackable metering container (C6) of essentially the same length, whose halves, when operating, are placed beside each other and parallel to the metering-unit container (C5), oriented with the latter, and which, with the aid of a baffle-plate device and openable hatches (L5, L6) in the upper side wall of the metering-unit container (C5) and in the lower side wall of each half of the stackable metering container (C6), enlarge the effective upper filling cross section of each hopper (34b) in the metering-unit container (C5).

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39. Transportable concrete mixing plant (10) according to Claim 38, characterized in that the baffle-plate device comprises baffle plates (36) which are permanently arranged in the stackable metering container (C6) and run obliquely and which, in the operating state, lengthen the walls of each hopper (34b) in the metering-unit container (C5) upwards into the halves of the stackable metering container (C6).

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40. Transportable concrete mixing plant (10) according to Claim 38 or 39, characterized in that the baffle-plate device further comprises baffle plates (38) which are rotatably mounted essentially at corners of the halves of the stackable metering container (C6).

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and, in the operating state, are folded out of the stackable metering container (C6) in such a way that they enlarge the hopper opening at the top.

5 41. Transportable concrete mixing plant (10) according to one of Claims 36 to 40, characterized in that in the metering-unit container (C5) there is also provided a feed conveying means (42) which runs underneath the weighing conveyor belt (34a), parallel 10 to the latter, and can be displaced in the longitudinal direction, partly out of the metering-unit container (C5), through an openable hatch (L5a) in an end face of the metering-unit container (C5).

15 42. Transportable concrete mixing plant (10) according to Claim 41, characterized in that the feed conveying means (42) is a conveyor belt.

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43. Transportable concrete mixing plant (10) according to Claim 41 or 42, characterized in that that end of the feed conveying means (42) which, in the operating state, is located outside the metering-unit container (C5) is arranged above the inclined conveying means (44) for feeding aggregates to the stackable 25 mixer container (C3).

44. Transportable concrete mixing plant (10) according to one of the preceding claims, characterized in that it also comprises an additive container (C9) to 30 accommodate concrete additives.

45. Transportable concrete mixing plant (10) according to one of the preceding claims, characterized in that it also comprises a control-station container 35 (C10), in which a control station for controlling the components of the concrete mixing plant (10) is accommodated.

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5 46. Transportable concrete mixing plant (10) according to one of the preceding claims, characterized in that it also comprises a water container (C11) or a container which accommodates water and/or concrete additives.

10 47. Transportable concrete mixing plant (10) according to one of the preceding claims, which, as a result of covering, insulation, partitioning, warming or heating (with warm air, heating steam, heating coils and so on) the individual mixing plant components (in particular the mixer container (C2) together with the stackable mixer container (C3), conveyor belts (34a, 44, 56, 62), metering-unit container (C5), additive 15 container (C9) and water container (C11) together with delivery lines), makes mixing operation possible even at ambient temperatures below 0°C.

20 48. Transportable concrete mixing plant (10) according to one of Claims 1 to 47, characterized in that it has a pressure conveying device (66), preferably a compressed-air conveying device, for conveying by pressure from at least one silo container (C7).

25 49. Transportable concrete mixing plant (10) according to Claim 48, characterized in that the pressure conveying device (66) comprises a collecting vessel (68) with a compressor (70) and a delivery hose 30 (72) connected to the collecting vessel (68).

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K 50. Transportable concrete mixing plant (10) according to one of Claims 6 to 49, characterized in that it has at least one intermediate binder container 35 (C12) for the intermediate storage of binder, which is preferably erected on at least one stackable mixer container (C3).

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51. Transportable concrete mixing plant (10) according to Claim 49 and Claim 50, characterized in that the delivery hose (72) opens into the at least one intermediate binder container (C12).

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52. Transportable concrete mixing plant (10) according to Claim 50 or 51, characterized in that the at least one intermediate binder container (C12) contains a hopper (74), which opens into a rotary feeder (76) which is arranged above a binder hopper (24) in a stackable mixer container (C3).

10 53. Transportable concrete mixing plant (10) according to Claim 49 or one of Claims 50 to 52, to the extent which they refer back to Claim 49, characterized in that the collecting vessel (68) and the compressor (70) are arranged in the lower region of the silo container (C7).

15 20 54. Transportable concrete mixing plant (10) according to one of the preceding claims, characterized in that it has binder silo containers and/or additive silo containers (C13) which, when operating, are stacked on one another and parallel to one another with 25 essentially horizontal orientation.

30 35 55. Transportable concrete mixing plant (10) according to Claim 54, characterized in that the binder silo containers and/or additive silo containers (C13) stacked on one another and parallel to one another with essentially horizontal orientation each have removable bottom and top surfaces.

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56. Transportable concrete mixing plant (10) according to Claim 54 or 55, characterized in that it has a final silo container (C13A) which can essentially be divided into two halves and whose halves (C13A1, C13A2), when operating, form the lowest (C13A1) and, respectively, the uppermost (C13A2) container of a

group of silo containers (C13) stacked on one another and parallel to one another.

57. Transportable concrete mixing plant (10) according to one of Claims 6 to 56, characterized in that at least one intermediate binder vessel (84) for the intermediate storage of binder is preferably arranged in a stackable mixer container (C3).

10 58. Transportable concrete mixing plant (10) according to Claim 57, characterized in that a binder delivery means (86), preferably a binder feed screw, for delivering binder from at least one intermediate binder vessel (84) into a binder hopper (24) is  
15 arranged in the stackable mixer container (C3).

59. Transportable concrete mixing plant (10) according to Claim 57 or 58, characterized in that it is designed to deliver binder and/or additives from a silo container (C7, C8, C13) and/or a transport vehicle into an intermediate binder vessel (84) and/or an intermediate binder container (C12), preferably having a feed-screw arrangement (18, 20, 22; 88) and/or a pressure conveying device (66).

25 60. Transportable concrete mixing plant (10)  
according to one of Claims 4 to 59, characterized in  
that when the plant is operating, a mixer container  
(C2) is set up on its ends on at least one other  
30 container (C1, C2, C3, C4, C5, C6, C7, C8, C9, C10,  
C11, C12, C13) in each case in such a way that concrete  
can be let out through the openable hatches (L2a) for  
removing concrete from the mixer container (C2) into a  
heavy goods vehicle (54) or the like provided under the  
35 mixer container (C2).

61. Use of a container, preferably a standard shipping container, in particular in a transportable

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concrete mixing plant (10) according to one of  
Claims 1 to 60, as a binder or additive silo.

62. Method of securing a binder or additive silo,  
5 preferably a container used as a silo in accordance  
with Claim 61, in a concrete mixing plant (10) against  
falling over, characterized in that the silo is  
fastened by means of transverse struts to components of  
the concrete mixing plant (10).

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63. Conveying means, preferably a conveyor belt,  
having a conveying direction which can be changed over  
optionally and which can also be moved to and fro in  
the longitudinal direction between various operating  
15 positions.

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64. Metering attachment for enlarging the effective  
catching cross section of a hopper of a metering unit,  
preferably a metering-unit container of a transportable  
20 concrete mixing plant (10) according to one of  
Claims 35 to 43, characterized in that the metering  
attachment is formed by a stackable metering container  
which can be divided into two halves and whose halves,  
stacked beside each other on the metering unit, extend  
25 the inclined walls of the hopper upwards by means of  
fixed baffle plates in the interior of the halves and  
baffle plates which can be folded outwards.

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